

CODLINGMOTH (CM) *Cydia pomonella*

Active Ingredient:
(E,E)-8,10-Dodecadien-1-ol

MAXIMIZE MATING DISRUPTION

CheckMate Puffer CM-O when combined with the Puffer Aerosol Cabinet is a mechanical system designed to dispense codlemone pheromone for control of CM in apples, pears, quinces, other pome fruits, peaches, nectarines, plums, prunes, and other stone fruits; CM and hickory shuckworm in walnuts, pecans, and other tree nuts. Used as directed, this product releases pheromone en masse throughout the orchard environment for an extended period of time (up to 200 days), decreasing the adult CM male's ability to find an individual calling female, thereby reducing mating, egg laying, and subsequent populations. Puffer CM-O is an ideal product for use in integrated Pest Management (IPM) strategies.

CheckMate Puffer CM-O benefits include:

- * NOP approved for organic production
- * Will not harm beneficial insects
- * No re-entry restrictions
- * No pesticide residues
- * Helps manage pesticide resistance
- * No environmental hazards
- * No impact on production schedules
- * Lower labor costs

CheckMate Puffer CM-O is specific for the control of CM and hickory shuckworm, leaving beneficial parasites and predators in the orchard. These beneficials aid in control of mites, aphids, and other secondary pests. Worm damage caused by other insects such as navel orangeworm or oriental fruit moth will not be controlled by CheckMate CM-O.

USE AND APPLICATION

For best results, hang Puffer Aerosol Cabinets loaded with CheckMate Puffer CM-O cans ("Puffers") early in the season, before or as soon as the first CM is detected (overwintering biofix) by a monitoring trap, such

as BioLure® pheromone trap, or by field scouting. Traps must be placed in the orchard early enough to detect the emergence of the first overwintering moths. When the first moth is detected, Puffers should be placed as high in the tree canopy as a sturdy branch allows, minimally within the upper one third of the tree canopy. The Puffers need to remain in the top one third of the tree canopy throughout the growing season, therefore the hang height should account for canopy changes such as new seasonal growth. Refer to the *Puffer Aerosol Cabinet Technology Use Guide* for additional deployment information. Refer to the *Puffer CM-O* product label for additional use information. Arrange Puffers in an evenly spaced grid or perimeter placement scheme throughout an orchard. If a grid placement scheme is utilized the resulting density should be at least one puffer canister per acre. For best results, use in orchards greater than or equal to 40 acres. Use in orchards less than 40 acres will lead to less than optimal results unless properly managed. Use in combination with other CM mating disruption products around the entire orchard perimeter where adjacent orchard(s) is not simultaneously treated with CM mating disruption. In situations with a prevailing wind, place additional canisters along the upwind edge to achieve uniform pheromone distribution within the interior of the orchard¹. If a perimeter placement scheme is utilized, hang Puffers at intervals of 140 feet around the perimeter of the orchard. Place the Puffer on the inner side of the tree facing into the orchard. In most large rectangular or square blocks this placement should result in a Puffer density of approximately one per acre. If perimeter placement results in less than one Puffer per acre, place additional Puffers uniformly throughout the interior of the orchard until a density of one per acre is achieved. Regardless of the placement scheme utilized, for best results Puffers should be at a density of at least one per acre, and up to two per acre in high pressure situations as determined by history and monitoring. This product only affects adult

male moths and will have no effect on female moths, eggs, or larvae. If application occurs following overwintering biofix or during the growing season, the orchard must be treated with insecticides that will effectively control hatching larvae until egg laying by previously mated female moths has ceased to occur. In moderate to high insect pressure situations, supplemental insecticide applications during the season may be necessary to provide adequate protection to developing fruit. Supplemental insecticide applications should be made based on trap monitoring, field scouting, and appropriate degree-day models for the local growing area¹, and must be timed to control emerging larvae. Manage migration from adjacent orchards, alternate sites, or hosts with border sprays and monitoring. Monitor orchards carefully for secondary insect pests such as leafrollers.

MONITORING INFORMATION

Monitor CM infestations with traps and by visual inspection of fruit. Early placement of monitoring traps is recommended along with careful field scouting. Monitoring adult populations with pheromone traps, such as BioLure, is strongly recommended to provide baseline and in-season information on population density and to improve timing of mating disruption and/or insecticide treatments. Place one trap per 10 acres with a minimum of two traps per block. Place traps at a height just below the Puffer aerosol cabinets, but in a different tree. Place additional traps on borders that are most subject to migration from adjacent fields or host crops. Check traps twice a week until biofix is established; thereafter, check traps weekly. Clean trap liners/bottoms after counting and recording each trap catch. Replace lures at product recommended intervals and trap liners/bottoms monthly or more often if they become dirty or covered with dust, spray material, moth scales, or other insect body parts. Do not handle other types of insect traps or lures before or after placement of traps without thoroughly washing hands. Pheromone traps are very useful for moni-

¹Consult Cooperative Extension recommendations for your area.

²Integrated Pest Management for Stone Fruits, University of California, Publication 3389

³Oregon State University Extension Service Publication EM 8904

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toring CheckMate applications but should not be the only method of monitoring potential moth infestations developing in an orchard. Pheromone mating disruption treatments will shut down trap catches of male moths. Pheromone lures, such as BioLure CM, cannot detect migration of CM females from adjacent fields or developing infestations of secondary pests. Kairomone lure traps are useful as a supplementary monitoring tool to help determine female CM overwintering biofix and in-season migrations from adjacent fields³.

MANAGEMENT OF CM

Control strategies for CM have typically involved the use of insecticides targeted at hatching larvae. Accurate prediction of egg hatch is critical and is best accomplished with degree-day models¹, pheromone traps, and field scouting. However, with over use, CM has demonstrated resistance to some insecticides, and the use of broad-spectrum insecticides has often resulted in increased costs for secondary pest control later in the growing season. The use of synthetic sex pheromones for disruption of mating is targeted at adult moths instead of hatching larvae. Accurate prediction of the emergence of moths from the overwintering populations is critical to time Puffer CM-O applications. The use of degree-day models¹, pheromone traps, and field observations are helpful for detecting the earliest emergence of the overwintering generation. By decreasing mating and subsequent egg laying, CM populations can be reduced. In situations with moderate to high CM pressure (problem and organic orchards), pheromone mating disruption and accurately timed insecticide sprays or other approved treatments targeted at larval populations can be used together in an IPM strategy.

CM BIOLOGY

CM is a major pest of apple and pear. It will also attack walnut, other tree nuts, quince, hawthorn, and some varieties of stone fruits. CM overwinters as a full-grown larva in an inactive state called diapause. The larvae pupate inside cocoons in early spring. As the weather warms in spring, moths begin to emerge and mate when twilight temperatures reach 62° F (16° C) or above. The moths are primarily active a few hours be-

fore and after twilight. Females will lay 30 to 70 eggs singly on leaf surfaces or on tiny fruit². Timing of initial flight activity can differ substantially between the sexes. Using a model based on female moth activity can more precisely predict the start of CM egg hatch³. Eggs of the overwintered population hatch approximately 158DD after being laid. Newly hatched larvae are pinkish white with a black head capsule, and bore into fruit within 24 hours after hatching. Mature larvae are about 3/4 inch long and pinkish white with a mottled brown head. At least two generations of CM per year will occur in most regions. A third and even a partial fourth generation will occur in warmer areas².

For more information about CheckMate products, contact your Suterra Technical Sales Representative, PCA, dealer, or call Suterra, LLC toll-free: 1-866-326-6737, or at www.suterra.com.

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